



## Quantitative assessment of the impact of climate variability and human activities on runoff changes for the upper reaches of Weihe River

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### Abstract:

In the wake of global and regional climate change and heightened human activities, runoff from some rivers in the world, especially in the arid and semi-arid regions, has significantly decreased. To reveal the varying characteristics leading to the change in runoff, detecting the influencing factors has been important in recent scientific discussions for water resources management in drainage basins. In this paper, an investigation into attributing the runoff response to climate change and human activities were conducted in two catchments (Wushan and Shetang), situated in the upper reaches of Weihe River in China. Prior to the identification of the factors that influenced runoff changes, the Mann-Kendall test was adopted to identify the trends in hydro-climate series. Also, change-points in the annual runoff were detected through Pettitt's test and the precipitation-runoff double cumulative curve method. It is found that both catchments presented significant negative trend in annual runoff and the detected change-point in runoff occurs in 1993. Hence, the pre-change period and post-change period are defined before and after 1993, respectively. Then, runoff response to climate change and human activities was quantitatively evaluated on the basis of hydrologic sensitivity analysis and hydrologic model simulation. They provided similar estimates of the percentage change in mean annual runoff for the post-change period over the considered catchments. It is found that the decline in annual runoff over both catchments can be mainly attributed to the human activities, the reduction percentages due to human activities range from 59 to 77 %. The results of this study can provide a reference for the development, utilization and management of the regional water resources and ecological environment protection.

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### Resource Description

#### Exposure : ☒

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Security, Meteorological Factors, Precipitation, Solar Radiation, Temperature

**Temperature:** Fluctuations

#### Geographic Feature: ☒

resource focuses on specific type of geography

# Climate Change and Human Health Literature Portal

Freshwater, Other Geographical Feature

**Other Geographical Feature :** Arid; Semi-arid

**Geographic Location:** 

resource focuses on specific location

Non-United States

**Non-United States:** Asia

**Asian Region/Country:** China

**Health Impact:** 

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

**Resource Type:** 

format or standard characteristic of resource

Research Article

**Timescale:** 

time period studied

Time Scale Unspecified

**Vulnerability/Impact Assessment:** 

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content